



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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01/24/02  
AS

Applicant: Woods et al.  
Title: Process for Hydroxyalkylating Carboxylic Acid-Functionalized  
Materials  
Serial No: 09/341,287  
Filed: August 19, 1999  
Atty. Docket No.: 1221.002USU/LC-302/PCT/US  
Examiner: D. R. Wilson  
Art Unit: 1713

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**DECLARATION UNDER 37 C.F.R. 1.132**

Commissioner for Patents  
Washington, DC 20231

Dear Sir:

1. I, Louis M. Alberino, hereby declare and state the following:
2. I am a citizen of the United States. I reside at 308 Redstone Drive, Cheshire, CT 06410.
3. I hold a Doctorate Degree in Chemical Engineering and have been continuously employed by Loctite Corporation since 1989. My current position is Vice President, Research, Development and Engineering, North America.
4. I am familiar with the subject matter of the above-identified patent application.

5. Nearly all chemicals used in the chemical industry, including ethylene oxide, are toxic to one degree or another to humans, animals and the environment. Despite this, millions of pounds of ethylene oxide are produced and used annually by the chemical industry. Thus, one would not automatically look for a replacement for a reagent, such as, ethylene oxide, simply because it might be hazardous. The mere fact that a chemical is hazardous does not, in and of itself, automatically suggest that the chemical should be replaced with another. On the contrary, in the present case, ethylene and propylene oxides are so inexpensive that any added safety costs associated with their use would be insufficient to offset the higher cost of alternative reagents, such as, ethylene and propylene carbonates.

6. The cost of ethylene oxide (tanks) is \$0.45 - 0.60/lb (Chemical Market Reporter, week ending 10/26/01). In contrast, the cost of ethylene carbonate (529 lb drums) is \$1.13/lb (BASF, customer service quote, 11/1/01). Similarly, the cost of propylene oxide (tanks) is \$0.64/lb (Chemical Market Reporter, week ending 10/26/01). In contrast, propylene carbonate (529 lb drums) is \$1.13/lb (BASF, customer service quote, 11/1/01). Based on the low price of ethylene and propylene oxide versus ethylene and propylene carbonate, respectively, I conclude that the toxicity of ethylene oxide alone would not provide sufficient motivation to replace ethylene oxide with ethylene carbonate.

7. The molecular weight of ethylene oxide is only 44 whereas the molecular weight of ethylene carbonate is 88, which is twice the molecular weight of ethylene oxide. In the hydroxyalkylation of a carboxyfunctional material using ethylene oxide as the hydroxyalkylating agent, 100% of the weight of the ethylene oxide is added to the carboxyfunctional material, so that all of the hydroxyalkylating agent is retained in the reaction product. There is no loss of material. In sharp contrast, in the hydroxyalkylation of a carboxyfunctional material using ethylene carbonate as the hydroxyalkylating agent, only 50% of the weight of the ethylene carbonate is added to

the carboxyfunctional material. The remaining 50% is lost as CO<sub>2</sub>, which is a by-product that has to be disposed of.

8. I conclude from the foregoing that ethylene carbonate is not an obvious alternative to ethylene oxide and that the toxicity of ethylene oxide alone would not provide sufficient motivation to replace ethylene oxide with ethylene carbonate. The reasons for this conclusion include the following:

- (a) ethylene carbonate costs nearly twice as much as ethylene oxide;
- (b) ethylene carbonate requires twice as much reagent to produce the same amount of product;
- (c) replacing ethylene oxide with ethylene carbonate quadruples the raw material costs; and
- (d) replacing ethylene oxide with ethylene carbonate produces CO<sub>2</sub> as a by-product, which has to be disposed of.

I hereby declare that all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true. I further declare that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

Dated: November 2, 2001

By:

*Louis M Alberino*

Louis M. Alberino, Ph.D.

Vice President

R., D. & Engineering, North America  
Loctite Corporation